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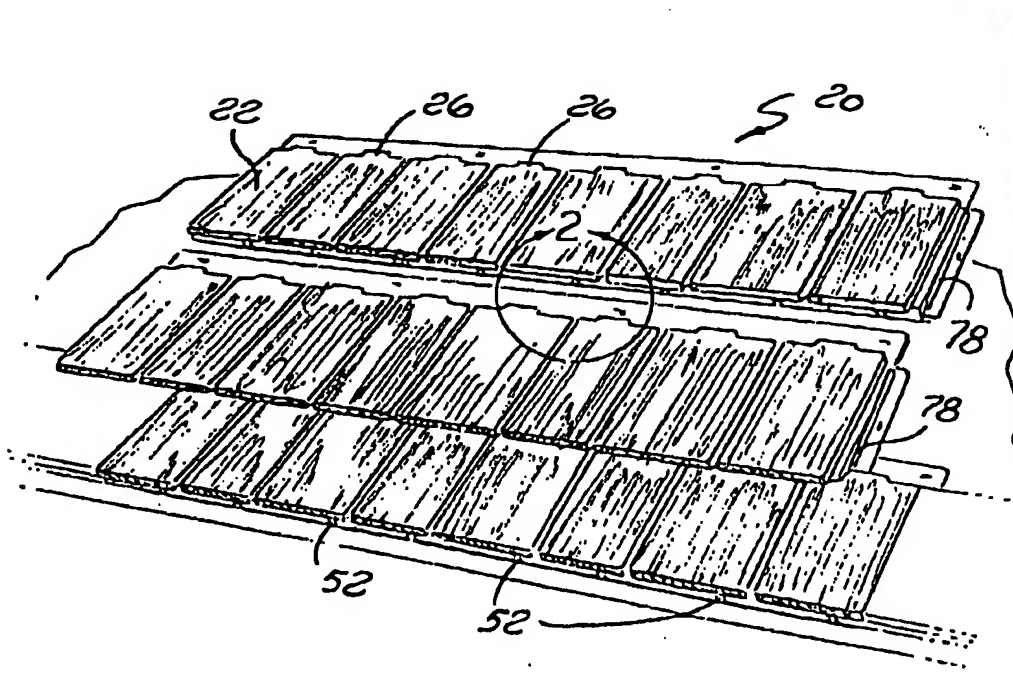
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(54) Title: INTERLOCKING PANELS WITH INFINITELY VARIABLE RELATIVE POSITIONING



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(57) Abrégé/Abstract:

Interlocking panels with infinitely variable relative positioning for use as siding and roofing panels. The panels are of relatively uniform thickness having raised decorative elements, such as by way of example, shake, tile, brick, stone and slate, to name a few, with a rear and side nailing flange thereon. The rear of the decorative elements include a rearward extending protrusion, with the front of the decorative elements having a continuous slot extending under the front edge of the decorative elements and effectively extending uninterrupted along the length of the panel. This allows the protrusions on the rear of the decorative elements of one course to engage the slot in the lower part of the next course in any relative position, so as to allow the breaking up of what would otherwise be a recognizable, limited pattern. The continuous slot weakens the front edge of individual panels so that the same should not be walked on. However, by properly proportioning the projections at the rear of the panel and the slot and structure therearound, support is provided for the slot in installed panels, making it safe to walk thereon as if the slot had been formed in a discontinuous manner. Fabrication of the panel may be by various techniques, though injection molding is preferred.

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ABSTRACT

Interlocking panels with infinitely variable relative positioning for use as siding and roofing panels. The panels are of relatively uniform thickness having raised decorative elements, such as by way of example, shake, tile, brick, stone and slate, to name a few, with a rear and side nailing flange thereon. The rear of the decorative elements include a rearward extending protrusion, with the front of the decorative elements having a continuous slot extending under the front edge of the decorative elements and effectively extending uninterrupted along the length of the panel. This allows the protrusions on the rear of the decorative elements of one course to engage the slot in the lower part of the next course in any relative position, so as to allow the breaking up of what would otherwise be a recognizable, limited pattern. The continuous slot weakens the front edge of individual panels so that the same should not be walked on. However, by properly proportioning the projections at the rear of the panel and the slot and structure therearound, support is provided for the slot in installed panels, making it safe to walk thereon as if the slot had been formed in a discontinuous manner. Fabrication of the panel may be by various techniques, though injection molding is preferred.

BACKGROUND OF THE INVENTION1. Field of the Invention

The present invention relates to the field of roofing and siding, and more particularly to interlocking decorative roofing  
5 and siding panels.

2. Prior Art

Roofing and siding panels of various kinds are well known in the prior art. Such panels are generally fabricated with raised  
10 decorative elements simulating classic roofing and siding materials, such as by way of example, shake, tile, brick, stone and slate, to name a few. Such panels may be fabricated from thermoplastic sheets, by injection molded plastic, fiberglass molding and formed aluminum, among other materials. In comparison  
15 to real wood shake, such panels are generally easier to install, require less care, and provide a reduced fire hazard and greater life. Of course, with respect to real tile, simulated tile panels further have the advantage of far less weight, reducing the structural requirement for the building itself, and of course  
20 being much safer in earthquake prone areas.

In U.S. Patent No. 4,598,522, interlocking panels are disclosed wherein each panel comprises a background sheet of relatively thin material in which are integrally formed one or more raised decorative elements such as simulated tile or shake

elements. At the front or lower edge of each panel, at least some of the decorative elements have a sunken or indented area integrally formed in the face thereof, and in the rear or upper portion of each decorative element, there are cooperatively disposed integrally formed protruding elements. During installation, after a starter course is installed, each panel of each successive course is retained in position at the front thereof by the interlocking of the sunken regions on the front of at least some of the decorative elements thereon with the protruding regions on the rear of the next lower course, and at the rear thereof by nails or staples passed through a nailing flange provided for that purpose. The fasteners are covered by the lower portion of the next higher course to provide an interlocking weatherproof system with hidden fasteners.

The sunken regions and the protruding regions on the decorative elements are specifically limited in lateral extent to significantly less than the width of the front and back of the decorative elements to avoid any intersections between the edges of the decorative elements and the interlockers. This design was particularly suited to fabrication by vacuum forming, as the preferable implementations thereof specifically avoided three sided corners wherever possible, particularly where generous rounding of the corner could not reasonably be affected.

Subsequent to the issuance of the foregoing patent, the concept of the patent was extended to an injection molded panel wherein the formation of three sided corners did not in itself

present any particular problem. However, such panels simulated a typical cedar shake and were characterized by a nailing flange at the rear and at one side of the panels. The side nailing flange was configured to go under a decorative member on the adjacent end of the next adjacent panel in a manner so as to provide a water seal with the rear nailing flange providing a means for fastening the panel down.

The projections on the back of the decorative elements on each panel were evenly spaced across the panel and extended over only a fraction of the width of each of the decorative elements. The depression in the front of the decorative elements took the form of a slot under the decorative elements, though the slot was interrupted periodically by webs under the decorative elements, providing direct coupling and support between the decorative elements and the underlying portion of the panel so that the panels could be walked on during and after installation without fear of cracking the panels because of the otherwise relatively unsupported channel opening.

These panels proved to be strong, durable, readily capable of being walked on, easily installed and long lasting. However, they had the disadvantage that the webs in the slot at the front of the decorative members for reinforcing purposes limited the range of positioning of the next course of panels relative to the prior course of panels, preventing an installer from fully randomly positioning one course with respect to the immediately lower course.

SUMMARY OF THE INVENTION

Interlocking panels with infinitely variable relative positioning for use as siding and roofing panels. The panels are of relatively uniform thickness having raised decorative elements, such as shako or tile-like elements, with a rear and side nailing flange thereon. The rear of the decorative elements include a rearward extending protrusion, with the front of the decorative elements having a continuous slot extending under the front edge of the decorative elements and effectively extending uninterrupted along the length of the panel. This allows the protrusions on the rear of the decorative elements of one course to engage the slot in the lower part of the next course in any relative position, so as to allow the breaking up of what would otherwise be a recognizable, limited pattern. The continuous slot weakens the front edge of individual panels so that the same should not be walked on. However, by properly proportioning the projections at the rear of the panel and the slot and structure therearound, support is provided for the slot in installed panels, making it safe to walk thereon as if the slot had been formed in a discontinuous manner. Fabrication of the panel may be by various techniques, though injection molding is preferred.

BRIEF DESCRIPTION OF THE FIGURES

Figure 1 is a perspective view of a preferred embodiment of the present invention.

Figure 2 is a perspective view taken on an expanded scale illustrating the fitting of tabs on one course into the slots in the front of panels in the next higher course.

Figures 3 and 3a is a front view and a partial side view of a prior art panel.

Figure 4 is a front view of a panel in accordance with the present invention.

Figure 5 is a partial side view of a panel in accordance with the present invention.

Figure 6 is a top view of a pair of panels illustrating how they fit together.

Figures 7a and 7b are side views illustrating two exemplary ways for panels of two adjacent courses to fit together.

Figure 8 is a perspective bottom view of a panel in accordance with the preferred embodiment of the present invention.

Figure 9 is a top view of an alternate embodiment of the invention.

Figure 10 is a perspective view of a still further embodiment.

Figure 11 is a perspective view illustrating the side moisture barrier interlock between adjacent panels.

Figure 12 is a cross section taken along lines 12-12 of Figure 11.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

First referring to Figure 1, a preferred embodiment of the present invention may be seen. In accordance with this embodiment, individual injection molded panels 20 are provided, characterized by a single row of decorative elements 22, specifically simulated cedar shake members integrally formed with upper and lower regions and left and right end regions. The entire panel is configured, as shall subsequently be described, so as to interfit with and interlock with respect to adjacent panels in a manner to form the required moisture barrier to provide aesthetic continuity across and up an area covered by the panels, whether the same are used for siding or roofing.

Of particular importance to the present invention is the fact that the panels will interlock and form the required moisture barriers with any lateral relative orientation of the panels, course to course. This provides unlimited flexibility in the positioning of each course relative to the other courses, allowing the breakup of what otherwise would be a somewhat repetitive pattern going up a building side or roof. In this regard, the individual simulated cedar decorative members formed on individual panels are purposely given different widths, which together with the ability for any relative positioning of panels course to course, avoids the monotonous repetition in pattern that would grossly detract from an otherwise aesthetically pleasing appearance of the building side or roof. In addition, the ability to interlock the panels at any relative lateral position, course

to course, is achieved in manner to be described so as to be fully capable of being walked on or being subjected to other extraordinary loads, either at the time of installation or as may purposely or accidentally occur during ordinary use.

5        Now referring to Figures 2 and 5, the nature of the slots 24 extending across the front of each panel may be seen. As shown in Figure 5 particularly, the slot 24 extends across the full width of the panel so as to be uninterrupted across an entire course of panels. This allows the tabs 26 (see particularly Figures 1, 2, 6  
10   and 7a and 7b) to extend into the slot at any lateral location along the entire course. This is to be compared with the prior art shown in Figures 3 and 3a wherein integral slot support members 28 were molded-in adjacent the edge of each simulated cedar panel to provide support for the slot structure when the  
15   panel is subjected to unusual loads. These support structures support each decorative element adjacent the edges thereof to prevent excessive stressing and cracking of the slot structure in regions 30 due to extraordinary loads. In particular, the substantially flat orthogonal front face member 32 of each  
20   decorative panel helps distribute a load imposed near the center of that decorative element across the width of the slot to provide a reasonable load bearing capability. However, extraordinary loads near an edge of a decorative element or spanning the edges of two decorative elements will cause much higher stresses in  
25   region 30 if the support structures 28 were not used.

In the present invention, the support structures 28 in the prior art of Figures 3 and 3a have been eliminated, as shown in Figure 5. This has the effect of creating an unsupported slot extending entirely across a panel, and for that matter, entirely  
5 across all panels of a particular course. Thus, region 34 of the slot structure is subject to high stresses and possible cracking or fracture when someone walks on the panel or the panel is otherwise subjected to high loads, particularly in cold weather.

In accordance with the present invention, it has been  
10 recognized that an installer can easily abstain from walking on an uninstalled panel and can otherwise avoid excessive loads and other abuse of the panels before installation. After installation, the equivalent of the support structure 28 of the prior art of Figures 3 and 3a may be provided by a tabs 26 in the  
15 rear structure of the decorative element of the next lower course, alone or in conjunction with the vertical rear portion of the decorative elements in the next lower course. This may be seen in the side cross sectional views of installed panels of Figures 7a and 7b. In Figure 7a, front wall section 36 together with the  
20 lower wall of the slot 24 fill the separation between the tab 26 and the rear nailing flange 40. This results in the positive locking, panel to panel, to prevent rattling of installed panels in windy conditions. Note that in this embodiment, the slot 24 is carefully controlled by design to be larger than the tab 26, or at  
25 least the portion thereof extending into the slot, but to only be slightly larger, so that in the case of the panel being subjected to extraordinary loads in the region of the slot, the slot

structure will flex well within its elastic range, even when cold, to pinch the tab 26 and be supported thereby and to be supported by the back wall 42 of the decorative elements on the next lower course of panels. This is to be compared to the prior art wherein  
5 the slot 24 was supported by the support members 28 (shown in Figure 3a) so that the slot didn't close on the tabs 26. Consequently the size of the slot wasn't that important, and in fact created a shadow line by being somewhat open. The same shadow line may be created in the embodiment of Figure 7a by the  
10 chamfer 38 if desired.

Figure 7b illustrates an alternate embodiment wherein the tab 26 fills slot 24. This prevents rattling of installed panels, and directly transfers any extraordinary load on that region of the panel directly to region 42 of the next lower course of panels.  
15 Again the shadow line may be created in the embodiment of Figure 7b by the chamfer 38 if desired.

In both the embodiments of Figure 7a and Figure 7b, the chamfer 38 may facilitate the assembly of panels during installation. Of course, while the tabs 26 are shown as being  
20 tapered on the bottom surface, the upper surface or both surfaces may be tapered, or the slot itself may be tapered, alone or in conjunction with tapered tabs. In that regard, tapering both surfaces of the tab, together with close control of tolerances, would allow the tab to spring the slot open somewhat until the  
25 member 36 and the lower structure of the slot filled the distance

between the tab and the nailing flange, combining the features of Figures 7a and 7b.

Now referring to Figure 8, an underside perspective of a part of a panel in accordance with the previous embodiment may be seen.

5 The panel 20 is injection molded with a substantially uniform thickness generally throughout the panel so that the decorative elements 22 are formed as members raised from a flat base plane 50, defined by the nailing flanges along the top and one side of each panel. The front face of each panel has indentations 52,  
10 also visible in Figures 1, 2 and 4, which in some instances such as the starter course for roofing, will be visible and which simulate individual shake members of an underlying starter course.

Now referring to Figure 9, a top view of an alternate embodiment of the present invention may be seen. In this  
15 embodiment, the panels consist of two courses of decorative elements 56 and 58, the courses being staggered with respect to each other. The panel is provided with a nailing flange 60 at the upper or rear thereof, and side nailing flanges 62 and 64. Each such panel in such embodiment would be provided with a continuous  
20 slot along the front edge of the lower course of decorative members 56, as described by way of example with reference to Figure 5 for a single course of panels, and preferably would further have region 66 slotted to receive the tab of an adjacent panel. The slot on region 66, however, while preferably  
25 continuous across the portion of decorative element 58 extending beyond the edge of lower decorative element 56, could be

discontinuous, provided it is slotted in the proper position for receipt of tab 68 on an adjacent panel, as obviously the relative lateral positions of the decorative elements 56 and 58 for the two courses integral to the panels themselves is predefined by the panel design. The slot across the front of decorative members 56, however, should definitely be continuous to allow any relative positioning of any two courses of such panels relative to the adjacent two courses of such panels.

A further alternate embodiment is illustrated in Figure 10, namely an embodiment comprising a single decorative element 70, again having a slot 72 extending all the way across the decorative element and of course with rear and side nailing flanges 74 and 76, respectively, and a rear tab 78 for positioning anywhere in the slot in the front of a similar member in the next higher course, or alternatively spanning two adjacent similar members in the next higher course.

Figure 11 illustrates the side interlocking of a single course panels, whether having a single decorative element 70 in accordance with Figure 10, or multiple decorative elements in a single course such as the embodiments hereinbefore described with respect to Figures 1 through 8. In particular, the side nailing flange 76 has a vertically raised water barrier 78 adjacent side 80 to define the slot for receiving the edge of an adjacent panel. This is illustrated in Figure 12, wherein the side of an adjacent panel 80 is shown fitting within the slot defined by moisture barrier 78 and the side of the raised area of an adjacent panel.

This, together with the surface tension of water, prevents any significant moisture from getting into this area. Also, any moisture which does in fact get into this area will be directed downward onto the top of the nailing flange of the course there  
5 below, whereby it may flow over the panel there below around the side of a decorative element thereon and over the rest of the lower panels to flow off the roof.

The same side interlocks are used on the embodiment of Figure 1 through 8, the raised moisture barrier 78 being visible by way  
10 of example in Figures 1 and 6. In the case of the embodiment of Figure 9, each course has a similar moisture barrier 78, any moisture getting into this region beside decorative element 58 being directed downward and around decorative element 56 on the next lower course of the panel, to be deposited upon the top of  
15 the next lower course.

The preferred embodiment has been disclosed herein with reference to a cedar shake simulation panel. Obviously the present invention may be incorporated into panels of other decorative designs, such as, by way of example, tile, brick, stone  
20 and slate, to name a few.

While preferred embodiments of the present invention have been disclosed and described in detail herein, it will be obvious to those skilled in the art that various changes in form and detail may be made therein without departing from the spirit and  
25 scope thereof.

CLAIMS

What is claimed is:

- 1           1.    A panel having front and rear edges and first and second  
2    side edges and adapted to interfit with similar panels when  
3    installed, comprising:
  - 4           an injection molded panel having:
    - 5           a nailing flange adjacent the rear edge of the panel;
    - 6           at least one raised simulated decorative element between the  
7    nailing flange and the front edge of the panel;
    - 8           a water barrier adjacent the first side edge of the panel and  
9    adapted to fit under a simulated decorative element of an  
10   identical panel adjacent the second side edge of the identical  
11   panel to form a water barrier between the sides of two adjacent  
12   panels;
    - 13          the at least one raised simulated decorative element having a  
14   slot extending across and below the entire simulated decorative  
15   element adjacent to front of the panel so as to have a slot  
16   opening unobstructed across the entire front of the panel;
    - 17          the at least one raised simulated decorative element further  
18   having a projection extending from the rear thereof over a part of  
19   the rear nailing flange;
    - 20          the projection having an elevation on the panel to fit within  
21   the slot of an adjacent panel in a next higher course of panels at  
22   any relative position along the width of the panel;

23 the projection having a width and thickness to adequately  
24 locally fill the slot of a similar adjacent panel in a next higher  
25 course of panels to provide support for the slot opening within  
26 the elastic range of the panel to resist damaging a panel when  
27 walking on or applying unusual loads on installed panels.

1 2. The panel of claim 1 wherein the at least one raised  
2 simulated decorative element consists of one raised decorative  
3 element.

1 3. The panel of claim 1 wherein the at least one raised  
2 simulated decorative element comprises a plurality of raised  
3 decorative elements forming a part of a single course of  
4 decorative elements, and the projection comprises a plurality of  
5 projections on the rear of the decorative elements of a number and  
6 spacing to provide support for the slot opening within the elastic  
7 range of the panel to resist damaging a panel when walking on or  
8 applying unusual loads anywhere along the front edge of installed  
9 panels.

1 4. The panel of claim 1 wherein the at least one raised  
2 simulated decorative element comprises a plurality of raised  
3 decorative elements forming a part of two courses of decorative

4 elements, and wherein the decorative elements in the two courses  
5 are staggered with respect to each other.

1 5. The panel of claim 4 wherein the first and second side  
2 edges of the panel adjacent one of the two courses are staggered  
3 with respect to the first and second side edges of the panel  
4 adjacent the other of the two courses, the second side edge of the  
5 panel for the decorative elements forming the course of decorative  
6 elements adjacent the nailing flange extends further to the side  
7 of the panel than the second side edge of the panel for the  
8 decorative elements for the course of decorative elements adjacent  
9 the front edge of the panel.

1 6. The panel of claim 1 wherein the decorative element is a  
2 simulated cedar shake decorative element.

1 7. A panel having front and rear edges and first and second  
2 side edges and adapted to interfit with similar panels when  
3 installed, comprising:  
4 an injection molded panel having:  
5 a nailing flange adjacent the rear edge of the panel;  
6 at least one raised simulated decorative element between the  
7 nailing flange and the front edge of the panel;

8 a water barrier adjacent the first side edge of the panel and  
9 adapted to fit under a simulated decorative element of an  
10 identical panel adjacent the second side edge of the identical  
11 panel to form a water barrier between the sides of two adjacent  
12 panels;

13 the at least one raised simulated decorative element having a  
14 slot extending across and below the entire simulated decorative  
15 element adjacent to the front of the panel so as to have a slot  
16 opening unobstructed across the entire front of the panel;

17 the at least one raised simulated decorative element further  
18 having a projection extending from the rear thereof over a part of  
19 the rear nailing flange;

20 the projection having an elevation on the panel to fit within  
21 the slot of an adjacent panel in a next higher course of panels at  
22 any relative position along the width of the panel;

23 the projection having a width and thickness to locally span  
24 the vertical height of the slot of a similar adjacent panel in a  
25 next higher course of panels to retain the front of one panel in a  
26 course with respect to the rear of the adjacent panel in a next  
27 lower course of panels, and to transfer the load from the front of  
28 a simulated element adjacent the front edge of the panel to the  
29 rear of a decorative element adjacent a rear edge of the panel in  
30 a next lower course of panels when walking on or applying unusual  
31 loads on installed panels.

1           8.    The panel of claim 7 wherein the at least one raised  
2 simulated decorative element consists of one raised decorative  
3 element.

1           9.    The panel of claim 7 wherein the at least one raised  
2 simulated decorative element comprises a plurality of raised  
3 decorative elements forming a part of a single course of  
4 decorative elements, and the projection comprises a plurality of  
5 projections on the rear of the decorative elements of a number and  
6 spacing to provide support for the slot opening within the elastic  
7 range of the panel to resist damaging a panel when walking on or  
8 applying unusual loads anywhere along the front edge of installed  
9 panels.

1           10.   The panel of claim 7 wherein the at least one raised  
2 simulated decorative element comprises a plurality of raised  
3 decorative elements forming a part of two courses of decorative  
4 elements, and wherein the decorative elements in the two courses  
5 are staggered with respect to each other.

1           11.   The panel of claim 10 wherein the first and second side  
2 edges of the panel adjacent one of the two courses are staggered  
3 with respect to the first and second side edges of the panel  
4 adjacent the other of the two courses, the second side edge of the

5 panel for the decorative elements forming the course of decorative  
6 elements adjacent the nailing flange extends further to the side  
7 of the panel than the second side edge of the panel for the  
8 decorative elements for the course of decorative elements adjacent  
9 the front edge of the panel.

1 12. The panel of claim 7 wherein the decorative element is a  
2 simulated cedar shake decorative element.

1 13. A panel having front and rear edges and first and second  
2 side edges and adapted to interfit with similar panels when  
3 installed, comprising:  
4 an injection molded panel having:  
5 a nailing flange adjacent the rear edge of the panel;  
6 at least one raised simulated decorative element between the  
7 nailing flange and the front edge of the panel;  
8 a water barrier adjacent the first side edge of the panel and  
9 adapted to fit under a simulated decorative element of an  
10 identical panel adjacent the second side edge of the identical  
11 panel to form a water barrier between the sides of two adjacent  
12 panels;  
13 the at least one raised simulated decorative element having a  
14 slot extending across and below the entire simulated decorative  
15 element adjacent the front of the panel so as to have a slot  
16 opening unobstructed across the entire front of the panel;

17        the at least one raised simulated decorative element further  
18        having a projection extending from the rear thereof over a part of  
19        the rear nailing flange;

20        the projection having an elevation on the panel to fit within  
21        the slot of an adjacent panel in a next higher course of panels at  
22        any relative position along the width of the panel.

1        14. The panel of claim 13 wherein the at least one raised  
2        simulated decorative element consists of one raised decorative  
3        element.

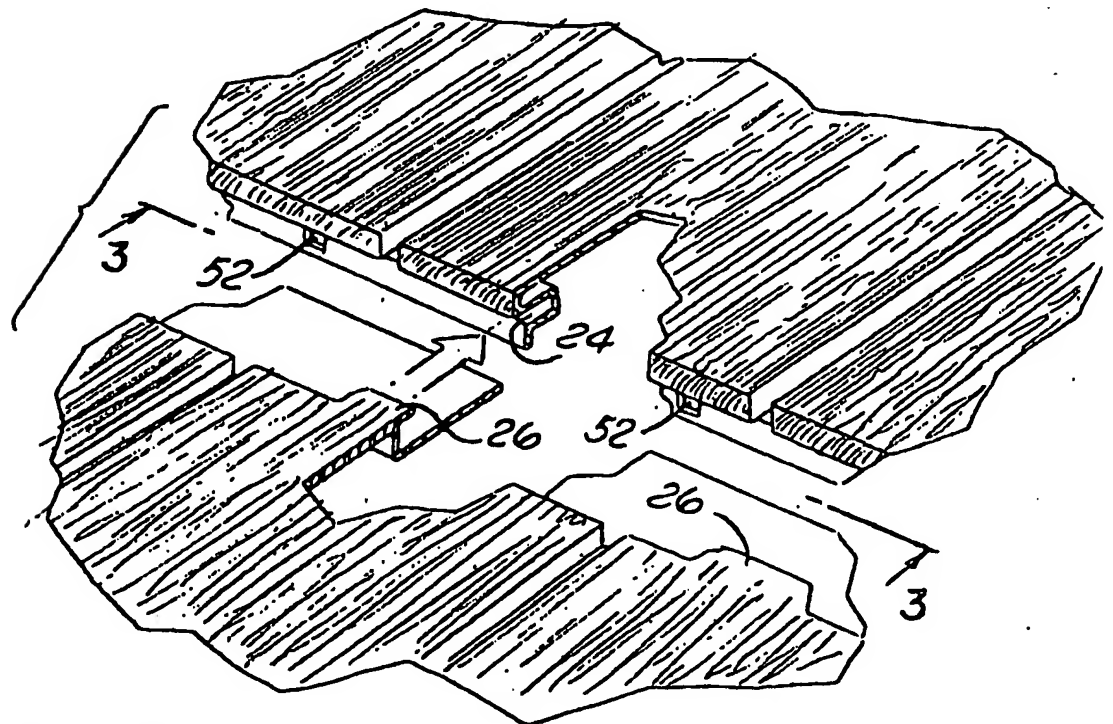
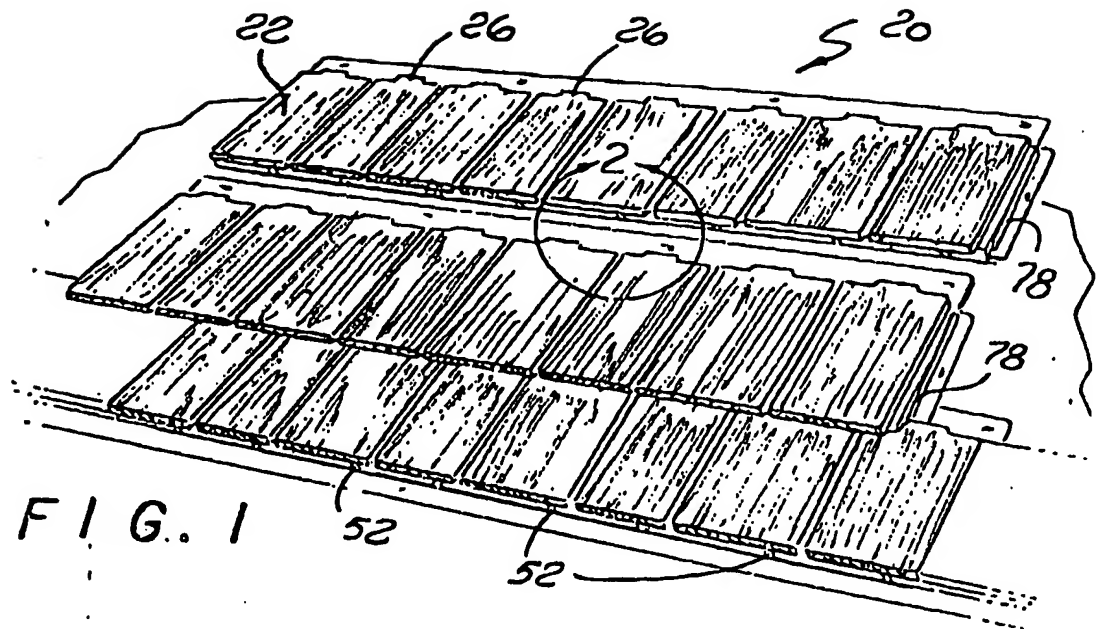
1        15. The panel of claim 13 wherein the at least one raised  
2        simulated decorative element comprises a plurality of raised  
3        decorative elements forming a part of a single course of  
4        decorative elements, and the projection comprises a plurality of  
5        projections on the rear of the decorative elements of a number and  
6        spacing to provide support for the slot opening within the elastic  
7        range of the panel to resist damaging a panel when walking on or  
8        applying unusual loads anywhere along the front edge of installed  
9        panels.

1        16. The panel of claim 13 wherein the at least one raised  
2        simulated decorative element comprises a plurality of raised  
3        decorative elements forming a part of two courses of decorative

4 elements, and wherein the decorative elements in the two courses  
5 are staggered with respect to each other.

1 17. The panel of claim 16 wherein the first and second side  
2 edges of the panel adjacent one of the two courses are staggered  
3 with respect to the first and second side edges of the panel  
4 adjacent the other of the two courses, the second side edge of the  
5 panel for the decorative elements forming the course of decorative  
6 elements adjacent the nailing flange extends further to the side  
7 of the panel than the second side edge of the panel for the  
8 decorative elements for the course of decorative elements adjacent  
9 the front edge of the panel.

1 18. The panel of claim 13 wherein the decorative element is  
2 a simulated cedar shake decorative element.



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FIG. 3 PRIOR ART

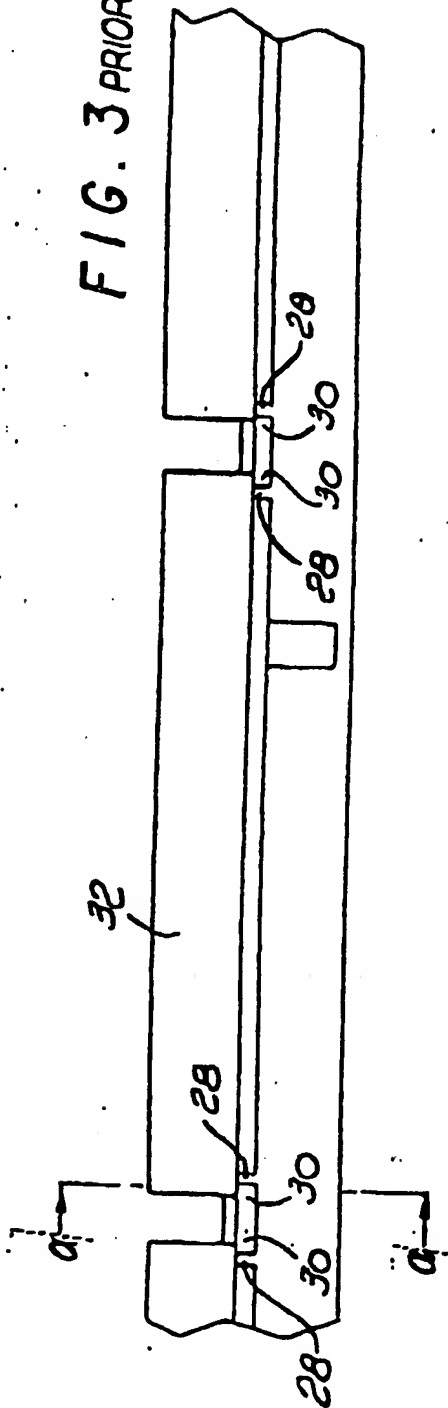


FIG. 5



FIG. 3a PRIOR ART

5

FIG. 4

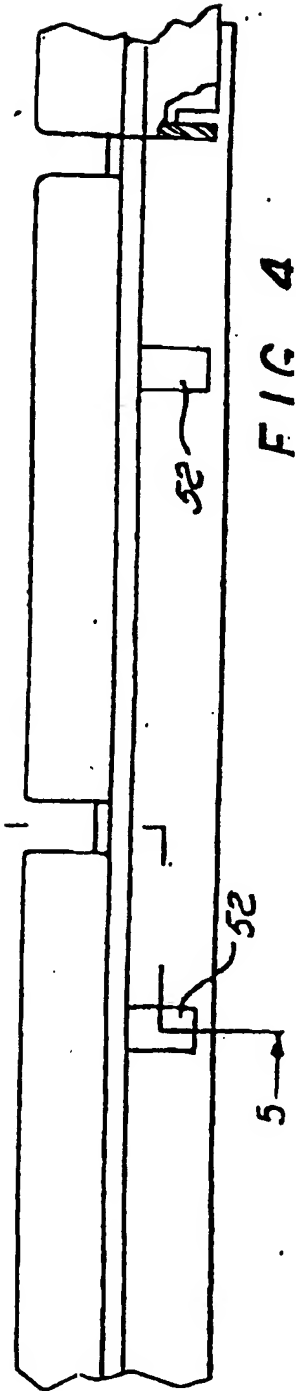


FIG. 6

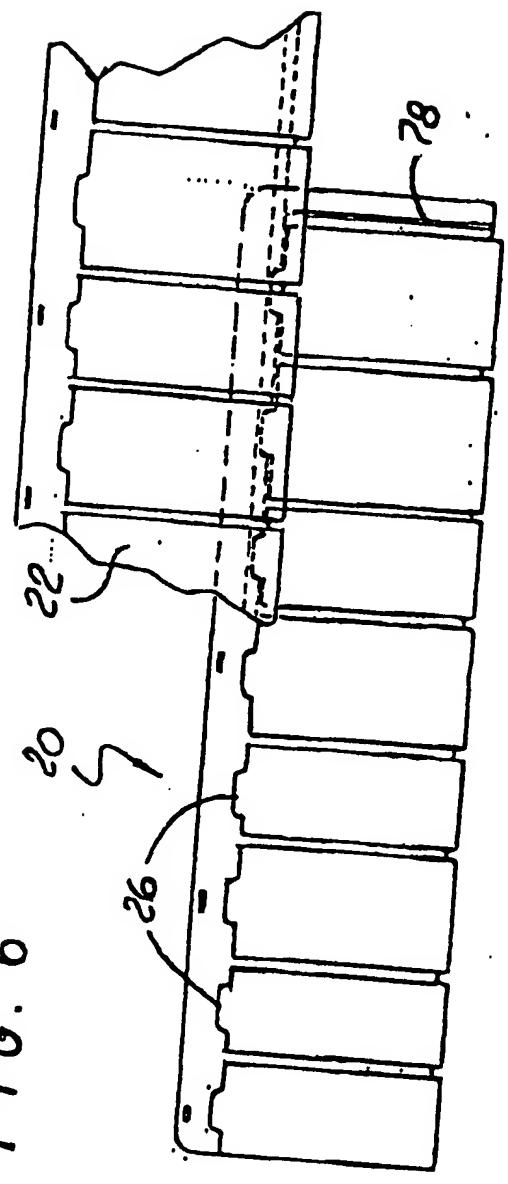


FIG. 7a

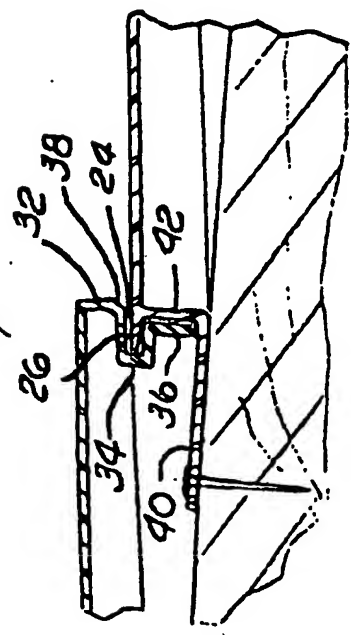
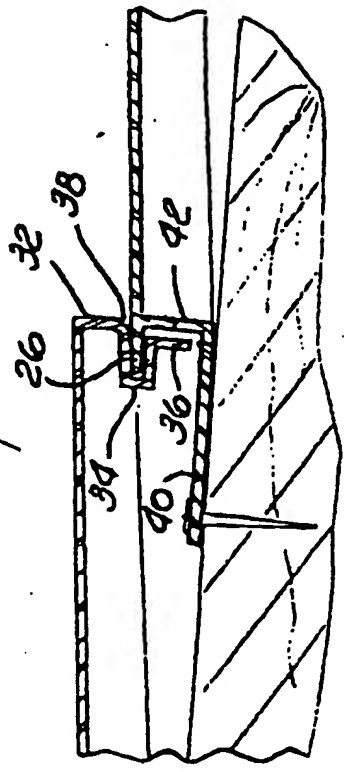


FIG. 7b



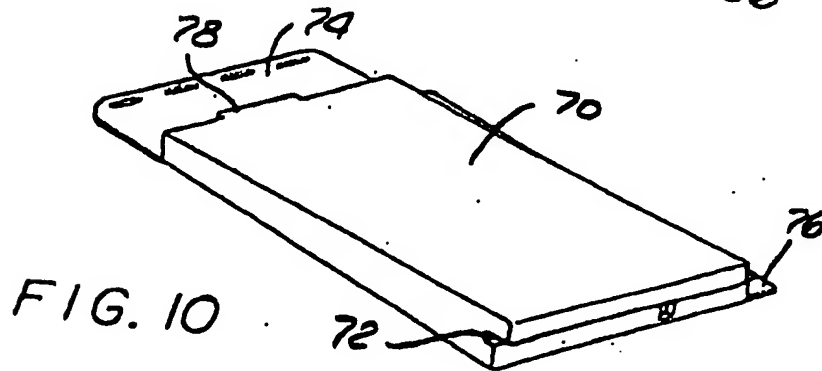
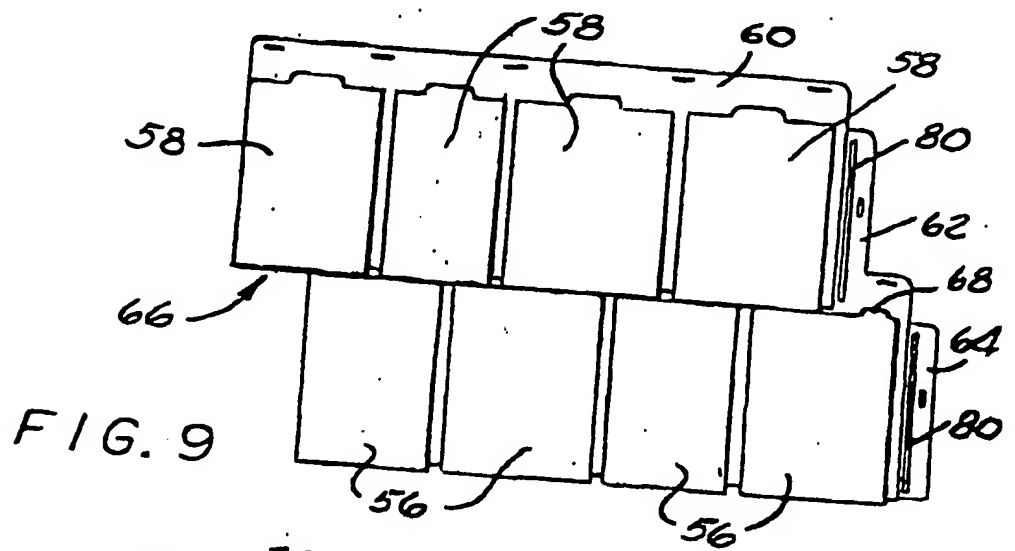
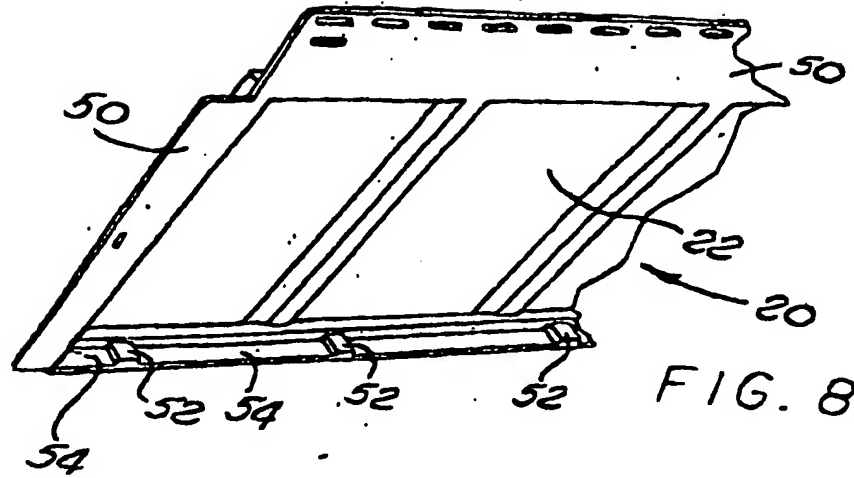


FIG 11

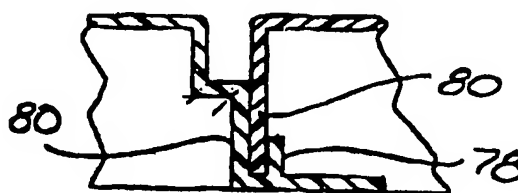
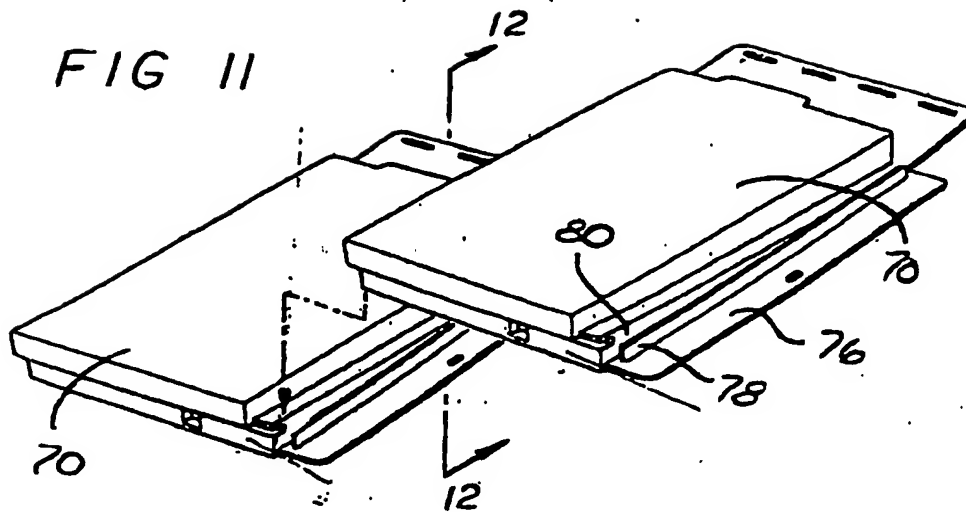
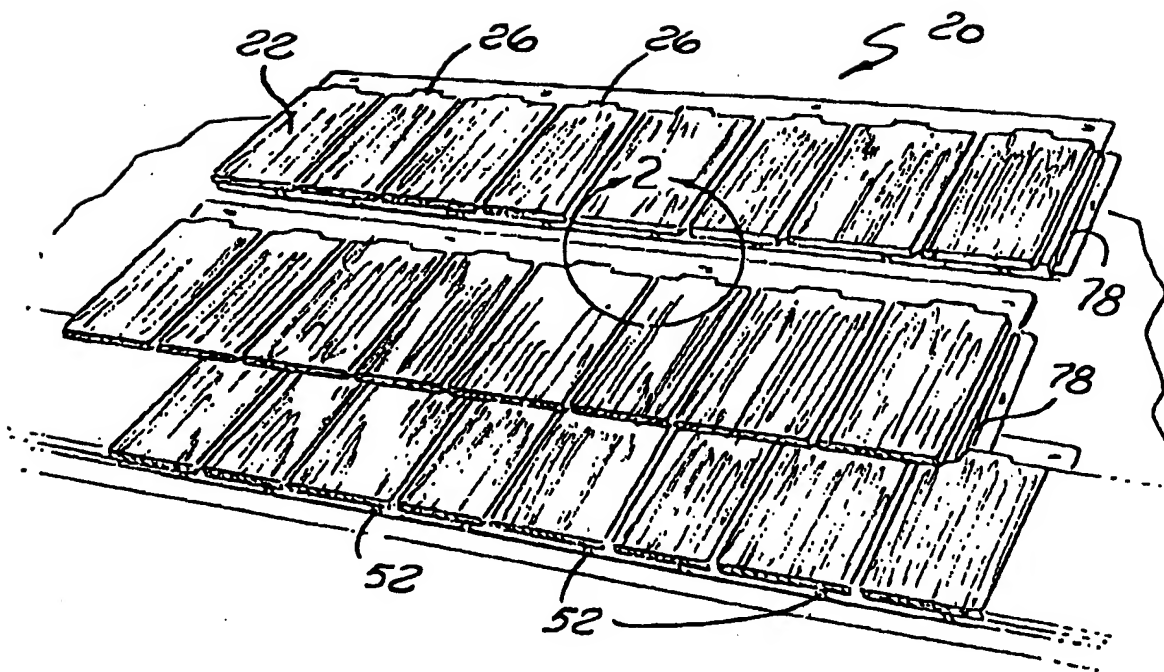


FIG. 12



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